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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,042	06/21/2006	Mareike Katharine Klee	NL03 1530 US1	6979
65913	7590	07/10/2007		
NXP, B.V. NXP INTELLECTUAL PROPERTY DEPARTMENT M/S41-SJ 1109 MCKAY DRIVE SAN JOSE, CA 95131			EXAMINER DOUGHERTY, THOMAS M	
			ART UNIT 2834	PAPER NUMBER
			NOTIFICATION DATE 07/10/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary

Application No.

10/584,042

Applicant(s)

KLEE ET AL.

Examiner

Thomas M. Dougherty

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 606.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the fourth electrode and the electrode thickness differences must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 and 3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no proper antecedent basis for citation of "the dielectric layer" in claim 2. Claim 3 is likewise rejected due to its dependence on claim 2.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Peng et al. (US 2002/0109436). Peng et al. show an electronic device being provided with a microelectromechanical system (MEMS) element, note that the device may be a microswitch or tunable capacitor in paragraph [0010]) that comprises: - a first electrode (401) that is present on a surface of a substrate (100); - a movable element (101, 103) that overlies at least partially the first electrode (401) and comprises a piezoelectric

actuator, which movable element (101, 103) is movable towards and from the substrate (100) by application of an actuation voltage between a first and a second position, in which first position it is separated from the substrate by a gap, wherein the piezoelectric actuator comprises a piezoelectric layer that is on opposite surfaces provided with a second (201) and a third electrode respectively (not explicitly shown), said second electrode (201) facing the substrate and said third electrode forming an input electrode of the MEMS element, so that a current path between through the MEMS element comprises the piezoelectric layer and the tunable gap.

As best understood, the first (401) and the second electrode (201) are arranged such that the first electrode (401) is in contact with the dielectric layer in the second, closed position of the movable element. Note that as the device is noted as a switch, it has a closed position.

The first electrode (401) contacts the second electrode (201) in the second, closed position of the movable element (101, 103).

The third electrode (not numbered but on top of piezoelectric layer 103) extends laterally as an interconnect to another element (105) in the device.

Claims 1, 2, 4, 6, 7, 10 are rejected under 35 U.S.C. 102e) as being anticipated by Mehta (US 2004/0075366). Mehta shows (figs 3A, 3B) an electronic device being provided with a microelectromechanical system (MEMS) element (200, see also the FIELD OF THE INVENTION) that comprises: - a first electrode (220) that is present on a surface of a substrate (217); - a movable element (211) that overlies at least partially the first electrode (220) and comprises a piezoelectric actuator (211), which movable

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element (211) is movable towards and from the substrate (217) by application of an actuation voltage between a first and a second position, in which first position it is separated from the substrate by a gap (fig. 3A), wherein the piezoelectric actuator comprises a piezoelectric layer (211) that is on opposite surfaces provided with a second (216, 219) and a third electrode respectively (213 or 214), said second electrode (216, 219) facing the substrate (217) and said third electrode (213 or 214) forming an input electrode of the MEMS element (200), so that a current path between through the MEMS element comprises the piezoelectric layer (211) and the tunable (see ABSTRACT) gap.

As best understood, the first (220) and the second electrode (216, 219) are arranged such that the first electrode (220) is in contact with the dielectric layer in the second, closed position (fig. 3B) of the movable element (211). The first electrode (401) contacts the second electrode (201) in the second, closed position of the movable element (211).

The third electrode (either of 213 or 214) extends laterally as an interconnect to another element (power supplies that provide $-V$ or $+V$) in the device.

The second electrode (212) is connected to ground (see fig. 3B), such that the third electrode (213, 214) functions as a transmission line.

At least one of the layers of the second and the third electrode (213, 214) is structured, such that portions of the piezoelectric layer (211) can be provided with different driving voltages (e.g. $-V$ and $+V$ as shown).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mehta (US 2004/0075366) in view of Needham et al. (GB 2 353 410). Given the invention of Mehta as noted above, he does not show a fourth electrode present on the substrate surface.

Needham et al. show (fig. 1) an electronic device being provided with an element (10) that comprises: - a first electrode (18) that is present on a surface of a substrate (12); - a movable element (26) that overlies at least partially the first electrode (18) and comprises a piezoelectric actuator (28), which movable element (28) is movable towards and from the substrate (12) by application of an actuation voltage between a first and a second position, in which first position it is separated from the substrate by a gap, wherein the piezoelectric actuator comprises a piezoelectric layer (28) that is on opposite surfaces provided with a second (24) and a third electrode (32) respectively, said second electrode (24) facing the substrate (12) and said third electrode (32) forming an input electrode element (26), so that a current path between through the element comprises the piezoelectric layer (28) and the tunable gap.

As best understood, the first (18) and the second electrode (30) are arranged such that the first electrode (18) is in contact with the dielectric layer in the second,

closed position of the movable element (26). The first electrode (18) contacts the second electrode (24) in the second, closed position of the movable element (26).

A fourth electrode (20) is present on the substrate surface, that contacts the second electrode (24), when the movable element (26) is in its second, closed position.

Needham et al. do not note that their device is a microelectromechanical device.

It would have been obvious to one having ordinary skill in the art to make a device such as is shown by Needham et al. as a microelectromechanical device, such as is shown by Mehta since MEMS switches provide advantages over other types of switches and they also have a wide variety of uses. See paragraphs [0004] and [0005] in Mehta's BACKGROUND OF THE INVENTION.

Claims 5, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mehta (US 2004/0075366). Given the invention of Mehta as noted above he does not show the movable element free of any additional structural layer, and at least one of the piezoelectric layer and the layer of the third electrode constitute a carrier layer of the movable element. He does not show the second electrode having a thickness that is at most half of the thickness of the third electrode. He does not show the thickness of the second electrode is at most a fifth of the thickness of the third electrode.

It would have been obvious to one having ordinary skill in the art to have a movable element free of any additionally structural layer in the device of Mehta at the time of his invention since it has been held that the omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. In re Karlson, 136 USPQ 184.

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Regarding recitation of the electrode thicknesses, it would have been obvious to one having ordinary skill in the art to size the electrodes as claimed, since it has been held where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional prior art cited reads on at least some aspects of the claimed invention.

Direct inquiry to Examiner Dougherty at (571) 272-2022.

tmd
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June 11, 2007


TOM DOUGHERTY
PRIMARY EXAMINER